

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
3 May 2001 (03.05.2001)

PCT

(10) International Publication Number
WO 01/30657 A2

(51) International Patent Classification⁷: **B65D**

[GB/GB]; 8 Farm Lodge Gardens, Carrickfergus, County Antrim BT38 8XL (GB).

(21) International Application Number: PCT/EP00/10683

(74) Agent: **O'CONNELL, Maura**; F R Kelly & Co, 9 University Street, Belfast BT7 1FY (GB).

(22) International Filing Date: 26 October 2000 (26.10.2000)

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(25) Filing Language: English

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(26) Publication Language: English

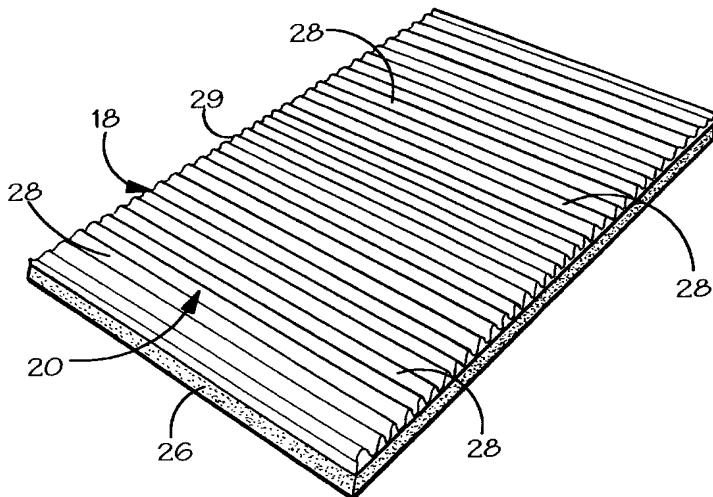
(30) Priority Data:
9925374.2 27 October 1999 (27.10.1999) GB

Published:

— Without international search report and to be republished upon receipt of that report.

[Continued on next page]

(54) Title: MICROWAVABLE COOKING PACKAGES



WO 01/30657 A2

(57) **Abstract:** One aspect of the invention provides a microwave susceptor having an obverse face for receiving a food item, the susceptor comprising channels formed in the obverse face for channelling moisture, which during use emanates from the food item, away from the food item. By channelling moisture, such as steam and juices, away from the food item, the food item is less soggy when cooked and therefore more palatable. A second aspect of the invention provides a package for cooking a food item using microwaves, the package comprising a box and a microwave susceptor. The box has a base and a lid arranged to overlap when closed together to form a seal around at least part of the interface therebetween so that the box is capable of maintaining a pressure within at above normal atmospheric pressure. The overlapping portions of the base member and the lid member are arranged to be forced apart by excess pressure within the box in order to regulate the pressure.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Microwavable Cooking Packages

Technical Field

5 The present invention relates to microwavable cooking packages. In particular, the present invention relates to a package for use in the heating and/or cooking of a food product, particularly but not exclusively meat products, by microwaves and to a microwave susceptor
10 for use in a microwavable cooking packages.

Background

It will be understood that the word 'cooking' as used
15 herein is intended to embrace the words 'partial cooking' and 'heating'.

The term 'microwave susceptor' as used herein refers to a structure which is capable of absorbing microwave
20 radiation and of becoming hot upon such absorption. A microwave susceptor is typically a laminated structure comprising a thin microwave-absorbing layer disposed between a polymer barrier layer and a structural backing layer. Typically, microwave susceptors are formed by depositing a thin conductive film, usually a metallic film, onto a polymer substrate and then laminating the resulting metallized polymer film onto a structural backing layer, for example cardboard.

Disclosure of the Invention

A first aspect of the present invention provides a microwave susceptor having an obverse face for

5 receiving a food item, the susceptor comprising channel means formed in the obverse face for channelling moisture, which during use emanates from the food item, away from the food item.

10 Preferably, the channel means comprises a plurality of channels. More preferably, the susceptor is corrugated to provide the channels.

15 Preferably, the obverse face is embossed to provide the channel means.

Preferably, the susceptor is associated with a moisture absorbing member arranged to absorb moisture from the channel means. More preferably, the moisture absorbing 20 layer is located adjacent the reverse face of the susceptor.

Preferably, the susceptor includes spacing means arranged to create a space between the susceptor and a 25 surface on which the susceptor is, in use, located, wherein the channel means is arranged to direct moisture into the space.

A further aspect of the invention provides a package 30 for cooking a food item using microwaves, the package

incorporating a microwave susceptor according to the first aspect of the invention.

Another aspect of the invention provides a package for
5 cooking a food item using microwaves, the package comprising a box and a microwave susceptor located, during use, within the box, the box having a base member and a lid member arranged to overlap when closed together to form a seal around at least part of the
10 interface between the base member and the lid member so that the box is capable of maintaining a pressure within the box at above normal atmospheric pressure, wherein the overlapping portions of the base member and the lid member are arranged to be forced apart by
15 excess pressure, which builds up during the cooking of the food item, within the box in order to regulate the pressure within the box.

Preferably, one of said base member and said lid member
20 includes a first flap arranged to engage with an overlapping portion of the other of said base member and said lid member and to be down-turned towards said one when so engaged, wherein the flap and the overlapping portion are arranged to be forced apart in
25 order to vent excess pressure within the box.

More preferably, one of said base member and said lid member includes a second flap arranged to fit within the other of the base member and the lid member when
30 closed together, wherein the second flap is arranged to

be forced against said other by pressure within the box in order to form at least part of said seal.

Preferably, the package further includes means for
5 fastening the lid member and the base member together.

More preferably, the base member and the lid member are hinged together and said fastening means comprises first and second co-operable fastening members carried
10 by a respective one of said base member and said lid member.

The invention further provides said package incorporating a microwave susceptor of the first aspect
15 of the invention.

Other advantageous aspects of the invention will become clear to those ordinarily skilled in the art upon
20 review of the following description and accompanying drawings. An embodiment of the invention is described by way of example and with reference to the accompanying drawings, in which:

25 **Figure 1** is a perspective view of a package according to one aspect of the present invention;

Figure 2 is a plan view of the package of Figure 1 in a pre-assembly state; and

Figure 3 is a perspective view of a microwave susceptor according to another aspect of the invention and suitable for use with the package of Figure 1; and

5 **Figure 4** is a perspective view of an alternative microwave susceptor according to the invention.

Referring now to the drawings there is shown, generally indicated at 10, a package for cooking a food item
10 using microwaves, and particularly for use in a microwave oven (not shown). The package 10 comprises a container in the form of a box 12. The box 12 has a walled base 14 and a walled lid 16, hinged together in conventional fashion. Preferably, the base 14 and the
15 lid 16 are integrally formed and a hinge 21 is formed by scoring the box 12 at the desired hinge location between the base 14 and the lid 16. The box 12 is formed from semi-rigid (i.e. flexible but self-supporting) material, preferably cardboard or heat
20 resistant plastics. Alternatively, the box, or carton, may be rigid or substantially rigid. Alternatively still, the container may take the form of a flexible pouch or bag formed from, for example, plastics. A box of the general type commonly known as a clam-shell or
25 burger box, is suitable for use as the box 12.

Figure 3 illustrates a support member 18 which includes a microwave susceptor. To this end, the support member 18 conveniently comprises a structural backing sheet or
30 layer 29 having an obverse face 20 and a reverse face (not visible). The obverse face 20 carries a thin

microwave-absorbing layer coated with a polymer barrier in conventional manner. The microwave-absorbing layer is formed from, for example, a thin film of aluminium. The structural backing sheet 29 is conveniently formed 5 from cardboard. It is therefore the obverse face 20 of the backing sheet 19 that absorbs microwaves and generates heat during use. It will be understood that the support member 18 may be constructed in any conventional manner that enables it to serve as a 10 microwave susceptor. The support member 18 is hereinafter referred to as first microwave susceptor 18.

In use, the first microwave susceptor 18 is located on 15 the in-use bottom face 24 of the base 14 of the box 12. Advantageously, between the first susceptor 18 and the bottom face 24 is provided a moisture absorbing member in the form of a pad 26. The pad 26 is formed from material which is capable of absorbing moisture, for 20 example high absorbency cotton, sponge or sponge-like material. Pads of the type which are commonly referred to as peach pads are particularly suitable for use as the pad 26. Preferably, the pad 26 is fixed to the reverse face of the first susceptor 18 and to the 25 bottom face 24 of the base 14 so that the pad 26 and the first susceptor 18 are held securely in place within the box 12. Preferably still, the pad 26 is integrally formed with the first susceptor 18 via lamination (as illustrated in Figure 3). It will be 30 appreciated that the first susceptor 18 and the pad 26 need not necessarily be fixed to each other or to the

box 12 and may, for example, rest, in use, inside the box 12.

The first susceptor 18 includes means for channelling moisture or liquid, formed in, or provided in, the obverse face of the susceptor 18, i.e. the face which absorbs microwaves and generates heat and thus the face on which, in use, a food product rests during cooking. In the Figure 3 embodiment the obverse face 20 of the first susceptor 18 is corrugated to define channel means in the form of a plurality of channels 28. The channels 28 are open-ended along opposite sides of the first susceptor 18 and run substantially parallel with one another. In Figure 4, an alternative arrangement is shown wherein the channels 28 run diagonally across the susceptor 18. It will be apparent to a skilled person that alternative forms and arrangements of one or more channels (not illustrated) may alternatively be used to the same or similar effect as is hereinafter described in accordance with the present invention. For example, in an alternative embodiment (not illustrated) a pattern is embossed on the obverse face of the susceptor whereby one or more channels are formed between the, or each, raised boss. The pattern may take any suitable form and may comprise, for example, a plurality of mutually spaced-apart stud-like bosses (e.g. rectangular, circular or polygonal in shape) or a plurality of mutually spaced-apart elongate or ridge-like bosses.

Advantageously, the remaining internal faces of the box 12 are provided with second microwave susceptors 30 (illustrated by shading in Figure 2). The second microwave susceptors 30 may be fixed onto the remaining 5 faces in conventional manner or may be integrally formed therewith i.e. a microwave susceptor film and a polymer barrier film are laminated onto the walls or face of the box 12. A 48 gauge polymer susceptor is preferred for this purpose.

10

The second microwave susceptors 30 may be the same as the first microwave susceptor 18 or may alternatively take the form of conventional microwave susceptors (not shown).

15

It is preferred that the second microwave susceptors cover as much of the inner surface of the box 12 as possible so that, when the box 12 is closed, the first and second susceptors 18, 30 together form a 20 substantially continuous susceptor layer around an item of food (not shown) contained within the box during use - this maximises the capacity of the package 10 to heat or cook the food item. To avoid excessive heat build up and possibly fire, however, it is important to 25 arrange the microwave susceptors so that there is no overlap of susceptors when the package 10 is in use. For example, and with reference in particular to Figure 2, the pre-assembly box 12 has a plurality of tabs 15 which, when the box 12 is assembled, are fixed to 30 adjacent walls 17. Each tab 15 is provided with a microwave susceptor (illustrated by shading in Figure

2) as is each wall 17. The microwave susceptor in each wall 17 is provided with a recess 19, in which there is no susceptor material, corresponding to each tab 15. Thus, when the box 12 is assembled, each tab 15 fits 5 into a corresponding recess 19 and no overlap of susceptor material occurs. In the case where the second susceptors 30 are separately formed from the walls 17, the recesses 19 can be formed by cutting the susceptors to shape and then fixing them to the walls 10 17. Where the susceptors 30 are laminated to the walls 17, the recesses 19 can be formed by de-metting an appropriately shaped area of the susceptor.

It will be understood that the degree to which the 15 remaining internal faces of the box 12 are covered by microwave susceptor material depends on the amount of heat required during cooking. Some food products require more heating (or higher temperatures) than others. The coverage of microwave susceptor material 20 inside the box 12 may therefore be determined by the intended use of the box i.e. on the food product that it is intended to cook. In some cases, the first susceptor 18 on its own may be sufficient.

25 In use, a food item (not shown) to be cooked is placed on the obverse face 20 of the first susceptor 18 (conventional browning agents, such as sucrose, or flavourings may be applied to the food item, as desired). The lid 16 is then closed so that the food 30 item is wholly contained within the box 12 and the box 12 is placed into a microwave oven (not shown). When

cooking commences moisture, such as steam and natural juices, emanates from the food item. This is particularly true when the food item is meat or poultry or a related product. In conventional microwave packages (not shown) such moisture is soaked up by the food product itself which tends to make the food product unpalatable after cooking.

However, with the package 10 of the invention, a significant portion of such moisture gathers in the channels 28 of the first susceptor 18. As the gathered moisture builds up, it drains along the channels 28 and out of their open ends whereupon it is absorbed by the pad 26. The pad 26 also absorbs moisture which may, during use, run down the inside walls of the box 12. Thus, the pad 26 absorbs and retains a quantity of moisture (depending on the size and absorbency of the pad 26) which would otherwise have been wholly or partially absorbed by the food item thereby rendering it unpalatable. It will be noted that, even before cooking commences, any juice or other moisture which emanates from the food item is absorbed by the pad 26 via the channels 28.

While the presence of the pad 26 is advantageous, it is not essential. In an alternative embodiment (not illustrated) the first susceptor may be provided with spacing means arranged to raise the susceptor off the bottom face of the box in use. Thus, moisture which drains out of the channels in the susceptor, or down the walls of the box, gathers beneath the first

susceptor and out of contact with the food product located on the susceptor. Alternatively still, the channels formed in the susceptor may be arranged to be sufficiently deep so as to gather and contain a 5 significant portion of the moisture which builds up during use thereby keeping the food product out of contact with the moisture. The first susceptor may conveniently be integrally formed with the cooking package.

10

The corrugations of the first susceptor 18 are further advantageous in that they increase the surface area of the obverse face 20 which in turn increases the capacity of the first susceptor 18 to heat the food 15 item.

Advantageously, the box 12 is arranged to enclose the food item during use such that hot gases and steam are retained within the box 12 above atmospheric pressure 20 during the cooking process. The heat and elevated pressure caused by such hot gasses and steam assist in the cooking of the food item. To prevent an explosion from within the box 12, the box 12 is arranged such that upon build up of pressure within above a pre- 25 determined level, at least some of the gases and steam are permitted to escape to relieve the pressure build up. This can be achieved by, for example, forming perforations (not shown) in the box 12 which will substantially retain the steam and gas below the pre- 30 determined pressure or by shaping the box 12 such that small gaps (not shown) are formed at the seams of the

box 12 when closed. With reference again to Figures 1 and 2, a preferred arrangement is now described.

The base 14 and the lid 16 of the box 12 are arranged
5 to overlap when closed together. The arrangement is such that, during use, the overlapping portions of the base 14 and lid 16 are arranged to press against one another thereby providing a seal along at least part of the interface between the base 14 and the lid 16.
10 During cooking, as excess pressure builds in the box 12, the steam (and other gases) are able to vent out of the box 12 by forcing the overlapping portions apart thereby regulating the pressure within the box 12. Hence, pressure is allowed to build up inside the box
15 above normal atmospheric pressure and this helps the cooking process.

By way of example, the side 43 of the base 14 in Figure 1 is provided with a first flap 40 running along its edge. The corresponding side edge 42 of the lid 16 is arranged to, when the box 12 is closed, engage with the flap 40 and to down-turn i.e. press the flap 40 downwardly against the side 43 of the base 14. In use, pressure inside the box 12 needs to build up before
25 steam and other gases are able to force their way between the flap 40 and side edge 42. A similar arrangement is provided on the other side of the box.

Another arrangement is provided at the front of the box
30 12. A second flap 44 is provided along the front edge of the base 14. When the box 12 is closed, the flap 44

fits inside the front side 45 of the lid 16. When pressure begins to build up inside the box 12, the flap 44 is pressed against the inside of the lid 16 and so provides a seal against escaping steam and gases.

5

It will be noted that the overlapping arrangement described above need not necessarily provide a seal around the entire periphery of the box 12. For example, in the Figure 1 embodiment, when the box 12 is 10 closed, gaps are formed at the corners of the interface between the base 14 and the lid 16, i.e. at either end of the hinge 21 and correspondingly at either end of the front of the box 12. It is sufficient that only part of the interface is sealed to allow adequate 15 pressure (and also temperature) build up within the box 12 before venting/regulation occurs.

The box 12 preferably also includes means for fastening the lid 16 and the base 14 together. In the Figure 1 20 embodiment, the fastening means comprises first and second co-operable fastening members 50, 52 carried by the base 14 and the lid 16 respectively. The fasteners 50, 52 inter-engage in conventional manner to hold the box 12 closed. This helps to allow pressure to build 25 up inside the box 12.

It will be noted that the box 12 may be used in conjunction with any conventional microwave susceptor (not shown) although the susceptor 18 of the invention 30 is preferred.

It will be apparent from the foregoing that the package of the present invention represents a significant improvement in the field of microwave cooking - items cooked using the package are crisper than those cooked 5 using conventional microwave packaging and more closely resemble items which have been cooked using a conventional oven. It is found that the package of the present invention is particularly suited to cooking poultry and other meat, and related products.

10

The invention is not limited to the embodiments described herein which may be modified or varied without departing from the scope of the invention.

CLAIMS:

1. A microwave susceptor having an obverse face for receiving a food item, the susceptor comprising channel means formed in the obverse face for channelling moisture, which during use emanates from the food item, away from the food item.
5
2. A microwave susceptor as claimed in Claim 1, in which the channel means comprises a plurality of channels.
10
3. A microwave susceptor as claimed in Claim 2, wherein the susceptor is corrugated to provide the channels.
15
4. A microwave susceptor as claimed in Claims 1 or 2, wherein said obverse face is embossed to provide the channel means.
20
5. A microwave susceptor as claimed in any proceeding claim, wherein the susceptor is associated with a moisture absorbing member arranged to absorb moisture from the channel means.
25
6. A microwave susceptor as claimed in Claim 5, wherein the moisture absorbing layer is located adjacent the reverse face of the susceptor.
- 30 7. A microwave susceptor as claimed in any preceding claim, the susceptor including spacing means arranged

to create a space between the susceptor and a surface on which the susceptor is, in use, located, wherein the channel means is arranged to direct moisture into the space.

5

8. A package for cooking a food item using microwaves, the package incorporating a microwave susceptor as claimed in any of Claims 1 to 7.

10 9. A package for cooking a food item using microwaves, the package comprising a box and a microwave susceptor located, during use, within the box, the box having a base member and a lid member arranged to overlap when closed together to form a seal around at least part of
15 the interface between the base member and the lid member so that the box is capable of maintaining a pressure within the box at above normal atmospheric pressure, wherein the overlapping portions of the base member and the lid member are arranged to be forced
20 apart by excess pressure, which builds up during the cooking of the food item, within the box in order to regulate the pressure within the box.

10. A package as claimed in Claim 9, wherein one of
25 said base member and said lid member includes a first flap arranged to engage with an overlapping portion of the other of said base member and said lid member and to be down-turned towards said one when so engaged, wherein the flap and the overlapping portion are
30 arranged to be forced apart in order to vent excess pressure within the box.

11. A package as claimed in Claim 10, wherein one of said base member and said lid member includes a second flap arranged to fit within the other of the base member and the lid member when closed together, wherein the second flap is arranged to be forced against said other by pressure within the box in order to form at least part of said seal.
- 10 12. A package as claimed in any of Claims 9 to 11, wherein the package further includes means for fastening the lid member and the base member together.
- 15 13. A package as claimed in Claim 12, wherein said base member and said lid member are hinged together and said fastening means comprises first and second co-operable fastening members carried by a respective one of said base member and said lid member.
- 20 14. A package as claimed in any of Claims 9 to 13, including a microwave susceptor as claimed in any of Claims 1 to 7.

1/3

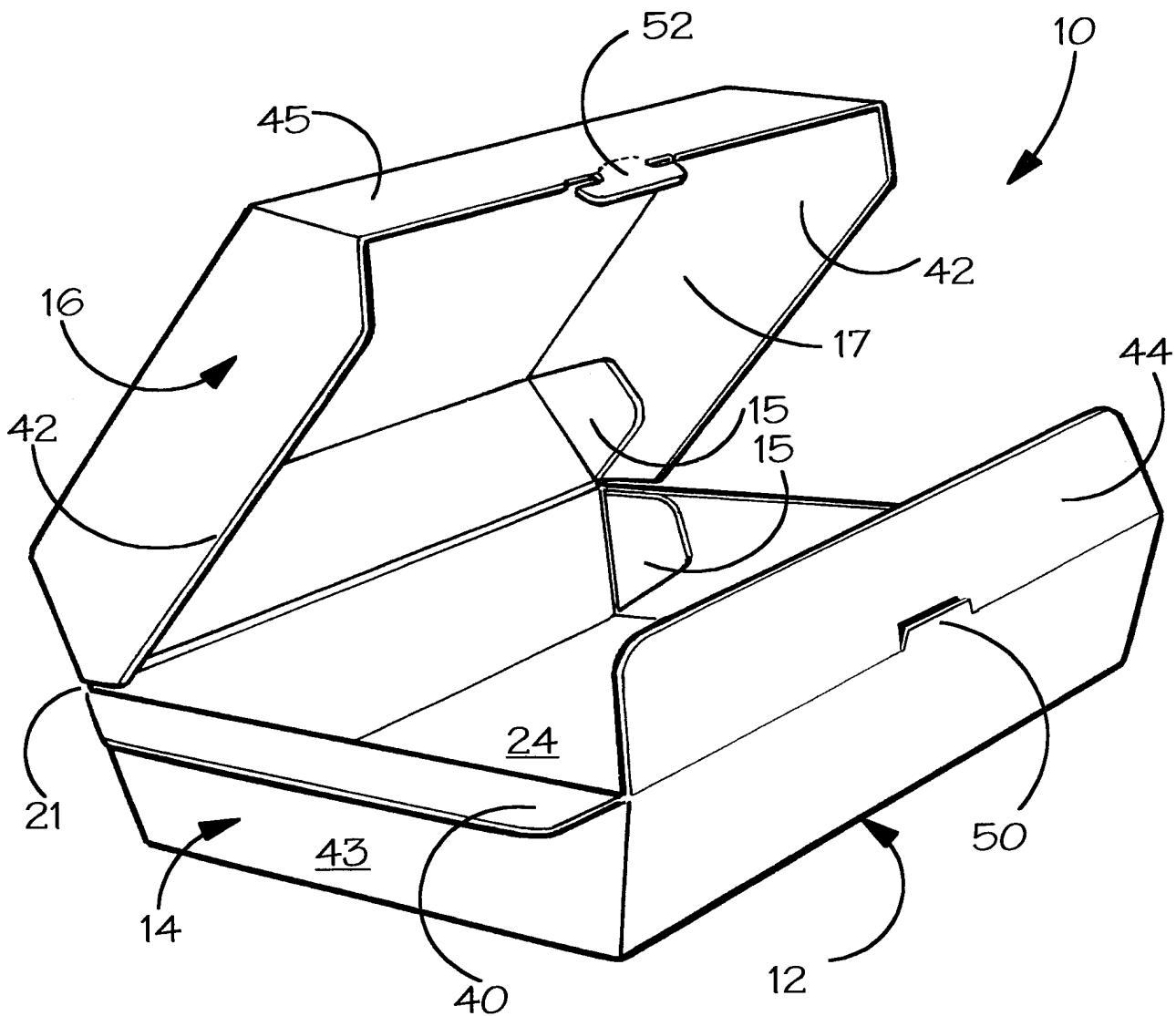


FIG.1.

2/3

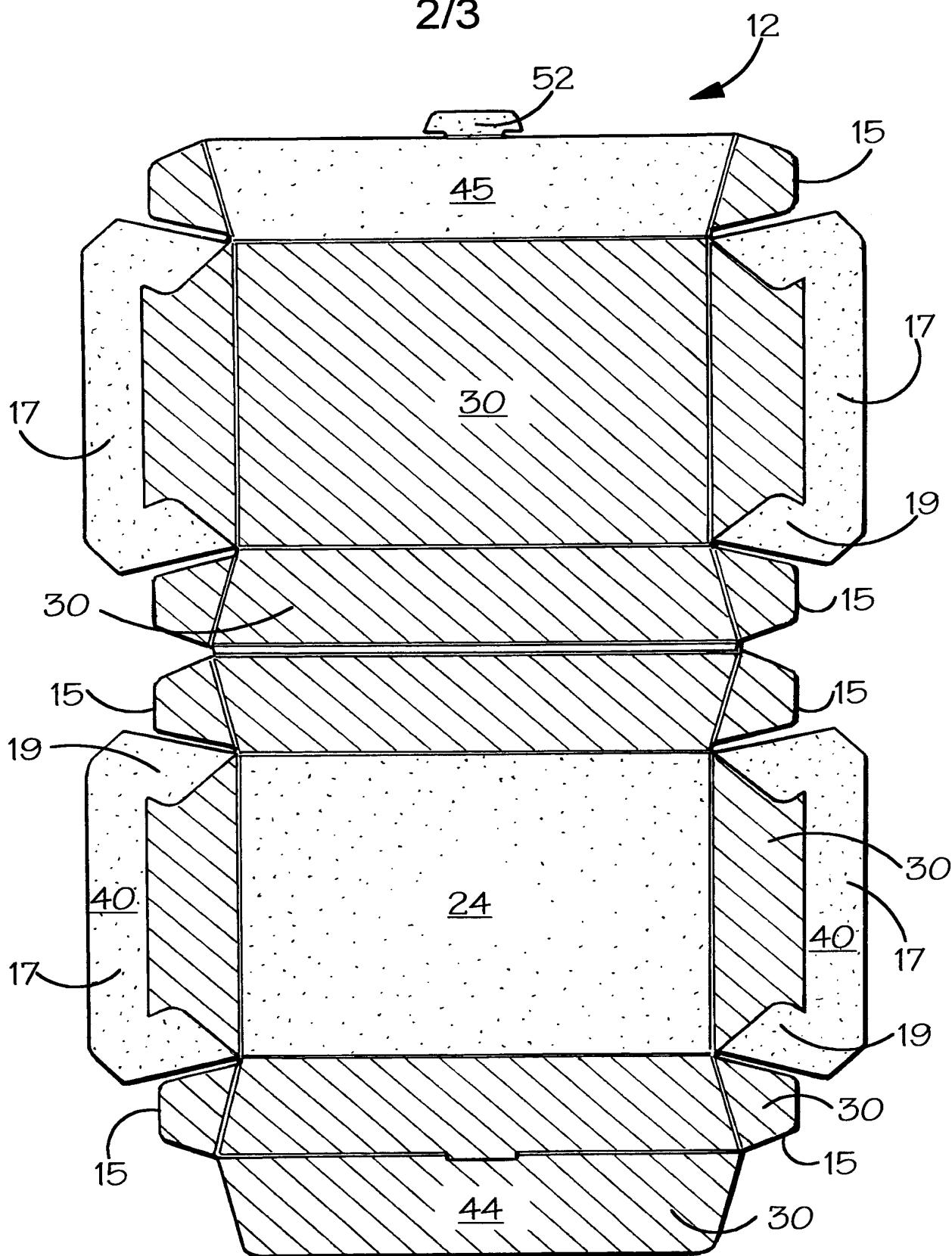
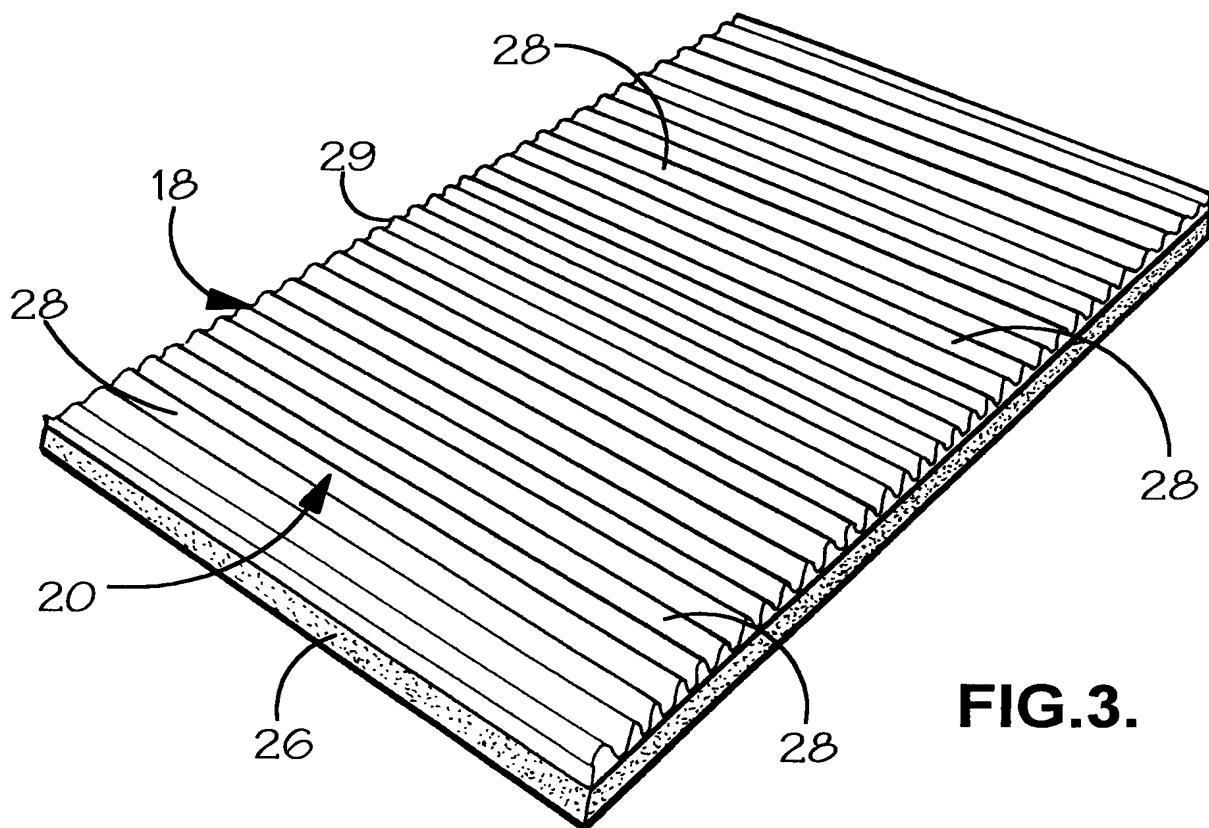
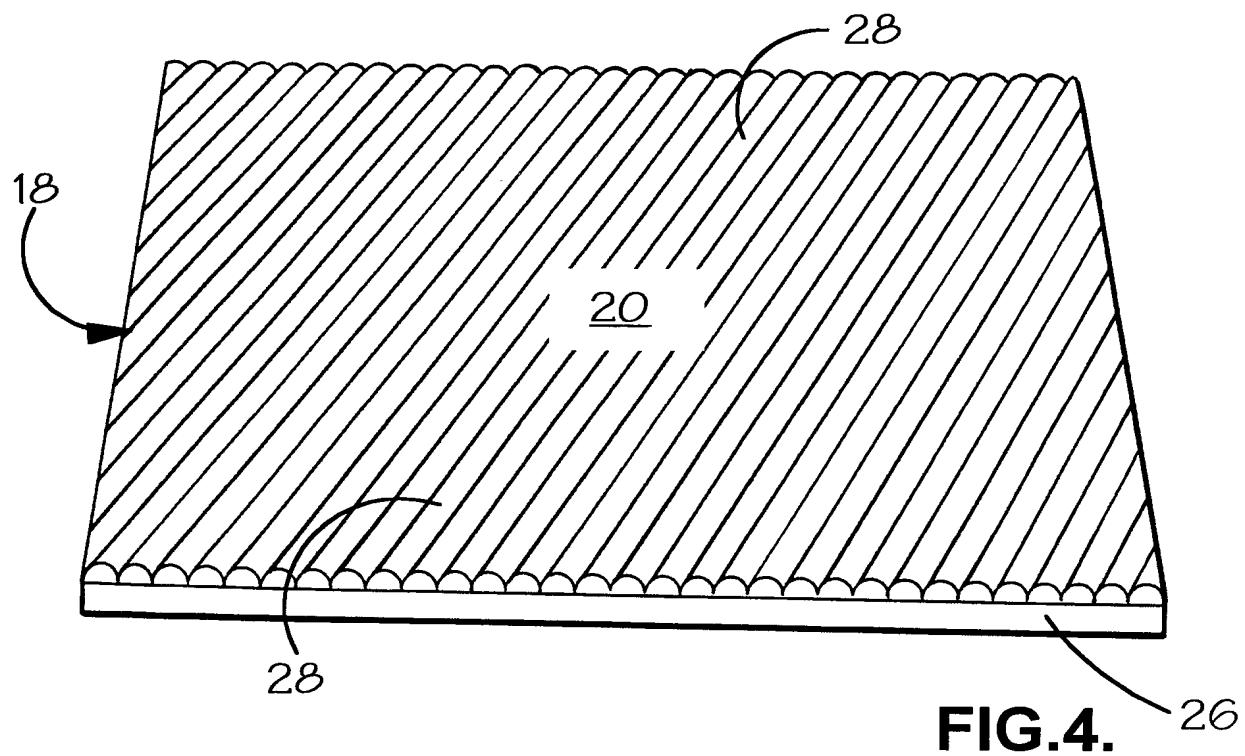


FIG.2.

SUBSTITUTE SHEET (RULE 26)

3/3

**FIG.3.****FIG.4.****SUBSTITUTE SHEET (RULE 26)**